Space Weather Forecast

Issued on Wednesday, 01 May 2024 at 13:23 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Further Moderate-class flares likely with a chance of Strong flares through the period.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity is at Moderate levels with a large Moderate flare peaking at 30/2346 UTC, and two further lower Moderate class flares at 30/1510 UTC and 30/1630 UTC, all originating from the large sunspot region in the southwest disc. There are currently six sunspot regions on the visible disc. The large region in the southwest continues to dominate the flare risk. This region continues to show significant complexity within its intermediate portion despite the increasingly distorted viewing angle as it moves towards the western limb. Remaining sunspot regions are all significantly smaller and simpler by comparison.

A filament (arc of the Sun's plasma) eruption beginning at 01/0600 UTC close to the large sunspot in the southwest disc resulted in a notable Coronal Mass Ejection (CME) signature in imagery. Analysis of this event is ongoing, however, due to its far-west location on the disc, is unlikely to have an Earth-directed component.

Solar Wind / Geomagnetic Activity: Solar winds decreased from slightly elevated to background through the period, with a peak speed of 425km/s at 30/1611 UTC as ongoing weak CME influence eased. The Interplanetary Magnetic Field was initially weak, but saw a number of stepwise increases after the CME arrival, reaching a sustained peak of moderate levels by the end of the period. The north-south component, Bz, initially weakly northwards (positive), saw erratic southward (negative) drops following the CME arrival to moderate levels, before changing to a moderately northward (positive) direction from around 01/0130 UTC. Resultant Geomagnetic activity was Quiet to Active (Kp 1-4).

Energetic Particles / Solar Radiation: Solar radiation was at background levels.

Four-Day Space Weather Forecast Summary

Solar Activity: Moderate solar activity is likely to continue with further Moderate flares now considered likely, and a slight chance of Strong flares, principally from the large and complex group in the southwest disc.

Solar Wind / Geomagnetic Activity: There is currently one CME that features in the forecast, associated with an eruption near centre disc approximately 29/0930 UTC. Modelling suggests the risk of a glancing blow from this feature sometime during day 3 (03 May). A notable CME that left the disc around 01/0600 UTC from the southwest disc is currently being analysed but is not expected to have an Earth-directed component.

Solar winds are currently at background levels (around 370km/s) with ongoing, but weak influence from a CME that arrived on 30 Apr. Effects should subside on day 1 (01 May), but a potential weak coronal hole connection may bring slightly enhanced wind speeds briefly on day 2 (02 May). Conditions are then expected to gradually return towards background through days 2 and 3 (02-03 May). Further HSS influence may see another increase in wind speeds back to

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elevated levels later on day 3 into day 4 (03-04 May).

Geomagnetic activity is expected to be generally Quiet to Unsettled through the period, but with a chance of Active intervals at times due to weak CME and coronal hole influence and a very slight chance of G1/Minor storm intervals.

Energetic Particles / Solar Radiation: Solar radiation is most likely to remain at background levels through this period. There is a chance for an S1/Minor Storm or greater event, should any proton-rich flares occur, primarily from the large, complex sunspot group in the western hemisphere.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	5	10	10	5
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	75	75	75	50
Very Active	R3 to R5 X	No	20	20	20	10

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	20	20	20	20
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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